# Performance Measurement for Sustainable Communities

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U.S. EPA Office of Sustainable Communities

# Presentation Outline

1. Overview: What is performance measurement?
2. A framework for performance measurements
3. Example performance measures
4. Free online tools for performance measurement and baseline analysis
5. Opportunity for technical assistance
6. Additional resources

# What is Performance Measurement?

Sustainable community performance measures…

- Systematically compare *outcomes* over time or space
- Document changes in :
  - the built environment
  - human behavior
  - demographics
  - economic trends
- Measure the effectiveness of policies, programs, or investments at promoting desired *outcomes*

# Common Goals of Performance Measurement

- Focus attention
- Build consensus
- Promote accountability
- Promote informed decision making

# Uses of performance measures

- Evaluating needs and baseline conditions
- Comparing planning scenarios
- Prioritizing capital improvement projects
- Measuring outcomes/progress over time
- Comparing progress in different places
- Communicating progress

# Example: Measuring progress over time

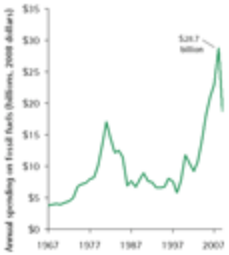
Energy consumption per person in the Pacific NW
Source: http://scorecard.sightline.org/

## Energy

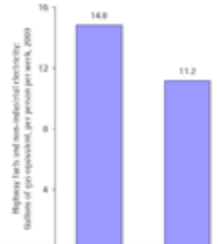
**INDICATOR:**
Gasoline, diesel, and electricity consumption

**TREND:**
Stuck in high gear


sources



*Spending on energy imports, Northwest states*



### Trend at a glance

Energy remains the worst-performing trend in the Cascadia Scorecard. Counting highway fuels and electricity in homes and businesses, Cascadians consume the energy-equivalent of just over two gallons of gasoline per person every day--nearly double the Scorecard model, Germany.

The money the region now pays for fossil fuels would be better spent on conservation, efficiency, and local, renewable energy sources--which would bring economic as well as environmental benefits to the region. A carbon cap-and-trade system, or a carbon tax on fossil fuels (modeled, perhaps, on British Columbia's existing carbon tax), would help reduce the toll of our fossil fuel habit by encouraging a smooth transition to a cleaner and more stable energy system.

*Updated June 2010. (Click for more information on Sightline's energy research.)*

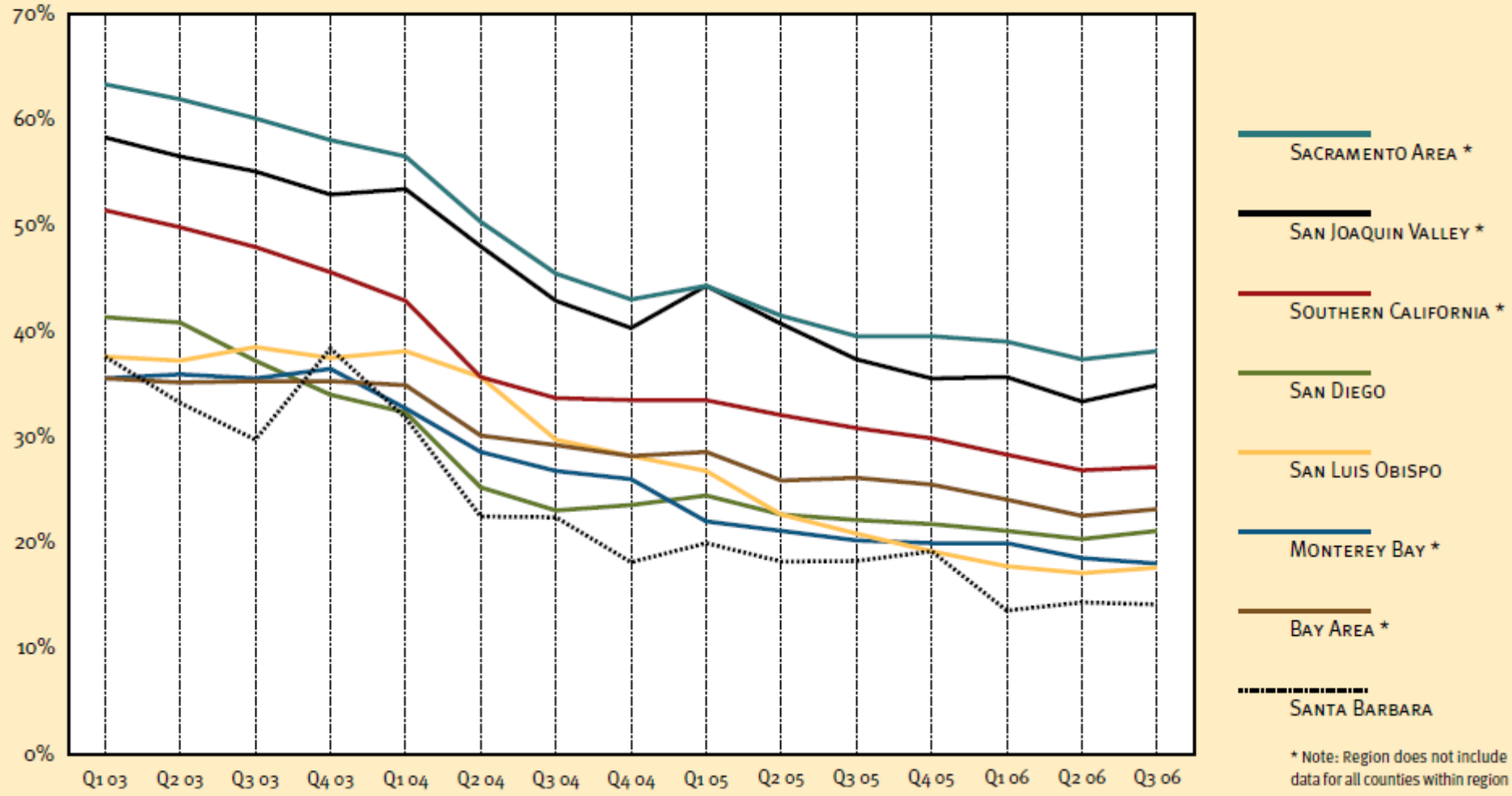
### More about energy

**What the energy indicator measures and why**

# Example: Measuring progress over time & comparing regions

## Housing Affordability

Percent of First Time Buyers that Can Afford to Purchase a Median Priced Home
2003-2006




Source: California Association of Realtors



Source: California Regional Progress Report

# Example: Comparing regional plan scenarios

## Design for Quality:

The design details of any land use development—such as the relationship to the street, setbacks, placement of garages, sidewalks, landscaping, the aesthetics of building design, and the design of the public right-of-way (the sidewalks, connected streets and paths, bike lanes, the width of streets)—are all factors that can influence the attractiveness of living in a compact development and facilitate the ease of walking and biking to work or neighborhood services. Good site and architectural design is an important factor in creating a sense of community and a sense of place.

### PEOPLE LIVING IN AREAS WITH GOOD OR EXCELLENT PEDESTRIAN FEATURES

*(in percent, 2050)*




In the Base Case, 34 percent of people would live in pedestrian-friendly neighborhoods. In the Blueprint Scenario, in 2050 that number would rise to 69 percent.

# HUD DOT EPA PARTNERSHIP FOR SUSTAINABLE COMMUNITIES (PSC)


**PSC Livability Principles**

- Provide more transportation choices
- Promote equitable, affordable housing
- Enhance economic competitiveness
- Support existing communities
- Coordinate and leverage federal policies and investment
- Value communities and neighborhoods

# Example performance measurement framework

## Principle #1 – Expand Transportation Choices

*Develop more convenient reliable, safe and economical transportation alternatives*

| Strategies: | Performance measures: | Indicators of progress: | Broad outcomes: |
|---|---|---|---|
| Expand high-quality transit service to employment centers | % of all jobs "well served" by transit | Transit trips per capita | Enhanced accessibility to jobs and services |
| | | % of commute trips made by transit | Lower HH transportation Costs |
| Focus new residential development in areas well served by transit | % of new homes "well served" by transit | VMT per capita | Improved public health |
| | | | Improved air quality |
| | | | Reduced GHG emissions |

# Large/Medium Sized Metro Area Performance Measures: Part 1

| Performance Measure | Data Source | Tool |
|---|---|---|
| Transit trips per capita | *Pop:* Census/ACS; *Transit trips:* NTD | Calculator |
| % of workers commuting by transit, bicycle, or foot | Census/ACS | FactFinder |
| Vehicle miles traveled (VMT) per capita | *Pop:* Census/ACS;<br>*VMT:* MPO or FHWA | Calculator |
| % of new homes that are well served by transit | *New housing units*: Local or Census/ACS;<br>*Transit*: Local or TOD Database | GIS |
| % of new homes within ½ mile of a major employment center | *New housing units*: Local or Census/ACS<br>*Employment centers: LEHD* | GIS |
| % of total employment well served by transit (by job location) | *Employment: LEHD*<br>*Transit*: Local or TOD Database | GIS / TOD Database |
| % of new construction on previously developed land | *Construction*: Local or ParcelPoint; *Land cover*: NLCD | GIS |
| Number of affordable homes well served by transit | *Affordable Homes*: Census/ACS<br>*Transit*: Local or TOD Database | GIS / TOD Database |
| Median household transportation costs | *Various variables relevant to calculating median transport costs:* Census/ACS | Calculator |

# Large/Medium Sized Metro Area Performance Measures: Part 2

| Performance Measure | Data Source | Tool |
|---|---|---|
| % of low income households within 30 minute transit commute of major employment center | *Low Income Pop:* Census/ACS; *Transit*: Local or TOD Database; *Employment centers:* LEHD | GIS |
| Acres of agricultural/natural resource land lost per new resident or employee | *Pop:* Census/ACS; *Employment:* LEHD; *Land cover*: NLCD | GIS |
| % of public sector investment in areas well served by transit | *Pub. sector inv.:* Local T*ransit*: Local or TOD Database | GIS |
| Dollars of private sector investment in areas well served by transit | *Construction*: Local or ParcelPoint; *Value*: Assessment or MLS; *Transit*: Local or TOD Database | GIS |
| Annual motor vehicle emissions per capita | *Pop:* Census/ACS; *VMT:* MPO or FHWA; Vehicle Fleet profile: Local, State, or NMIM; or *Emissions*: NEI | Calculator |
| Bicyclist and pedestrian fatality rate | NHTSA | Calculator |
| % of homes within ½ miles of recreational opportunities AND neighborhood retail/services | *Homes*: Census/ACS *Parks*: Local or NAVTEQ *Employment:* LEHD | GIS |

# Rural Area Performance Measures: Part 1

| Performance Measure | Data Source | Tool |
|---|---|---|
| Transit trips per capita *(where applicable)* | *Pop:* Census/ACS; *Transit trips:* NTD | Calculator |
| % of workers commuting by transit, bicycle, or foot | Census/ACS | FactFinder |
| Vehicle miles traveled (VMT) per capita | *Pop:* Census/ACS;<br>*VMT:* FHWA (select areas only) | Calculator |
| % of new homes within ½ mile of rural town centers | *New housing units*: Local or Census/ACS | GIS |
| % of new homes within ½ mile of a major employment center | *New housing units*: Local or Census/ACS<br>*Employment centers:* LEHD | GIS |
| % of total employment within ½ mile of rural town centers | *Employment:* LEHD | OnTheMap |
| % of new construction on previously developed land | *Construction*: Local or ParcelPoint; *Land cover*: NLCD | GIS |
| Number of affordable homes within ½ mile of rural town centers | *Affordable Homes*: Census/ACS | GIS |
| Median household transportation costs | *Various variables relevant to calculating median transport costs:* Census/ACS | Calculator |
| % of low income households within 30 minute commute of major employment center | *Low Income Pop:* Census/ACS<br>*Employment centers:* LEHD | GIS |

*Note: "Rural Town Centers" must be defined locally. They may be historic main streets or "activity centers" with concentrations of retail/service employment.*

# Rural Area Performance Measures: Part 2

| Performance Measure | Data Source | Tool |
|---|---|---|
| Acres of agricultural/natural resource land lost per new resident or employee | *Pop:* Census/ACS; *Employment: LEHD; Land cover*: NLCD | GIS |
| % of public sector investment within ½ mile of rural town centers | *Pub. sector inv.:* Local | GIS |
| Annual motor vehicle emissions per capita | *Pop:* Census/ACS; *VMT:* MPO or FHWA; Vehicle Fleet profile: Local, State, or NMIM doc; or *Emissions*: NEI | Calculator |
| Bicyclist and pedestrian fatality rate | NHTSA | Calculator |
| % of homes within ½ miles of recreational opportunities AND neighborhood retail/services | *Homes*: Census/ACS<br>*Parks*: Local or NAVTEQ<br>*Employment:* LEHD | GIS |
| % of new or improved roadways (by mile) that include sidewalks and/or bicycle infrastructure | *New roadway miles:* Local;<br>*New bike/ped. Infrastructure miles:* Local | GIS or Calculator |
| %of non-urbanized area pop. covered by demand response transit service at least 3 days per week | *Transit service area*: Local;<br>*Population:* Census/ACS | GIS |
| Ave. number of daily scheduled intercity bus and rail departures from a rural town center to cities where health care, schools, job centers, and other regional services are available | *Transit schedules:* Local | Calculator |
| Economic diversity measures: % of all jobs at the region's three largest employers; % of all jobs in small/medium sized firms; % of jobs in locally controlled firms | *Total employment*: *LEHD;*<br>*Employment by firm:* Local or Claritas | Calculator |

*Note: Rural Town Centers must be defined locally. They may be historic main streets or "activity centers" with concentrations of retail/service employment.*

# Free Online Tools for Performance Measurement

- Transit Oriented Development (TOD) Database
- Census LED OnTheMap

| *Performance Measure:* | **Percentage of total regional employment near fixed guideway transit** |
|---|---|
| *Tool:* | TOD Database |

TOD Database  Log Out  User Guide  CTOD CENTER FOR TRANSIT-ORIENTED DEVELOPMENT

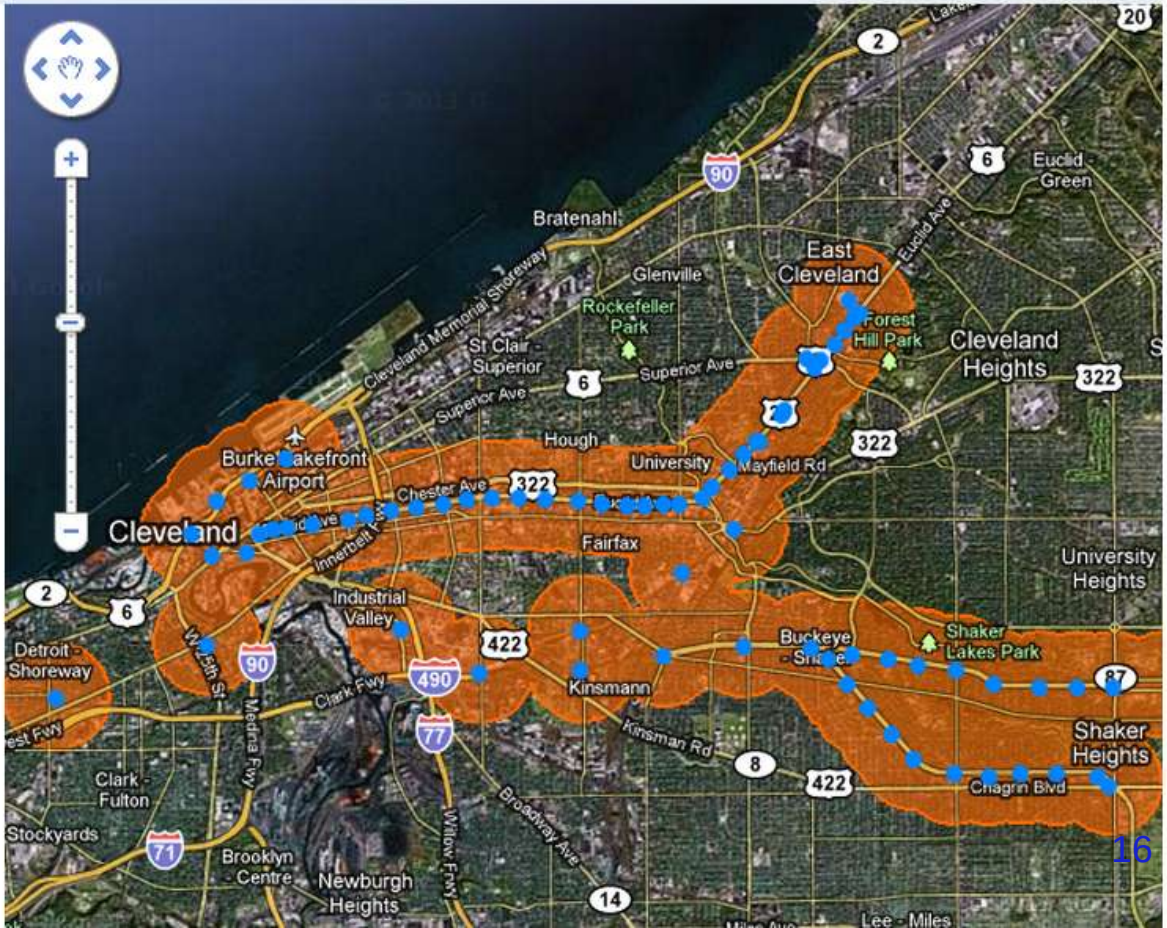
Cleveland  Region

Transit Zone: .25 mile .5 mile  Smart Zoom

Selected Station  Station  Existing Transit  Potential Transit  Transit Region

Existing Transit

- GCRTA
  - Blue Line
  - Green Line
  - Health Line BRT
  - Red Line
  - Waterfront Line




Report  Data  Geographies  Full Report

**Cleveland Transit Region:**

| | |
|---|---|
| Total workers employed in Professional Occupations: (1) | 534,960 |
| Total workers employed in Service and Support Occupations: (2) | 303,087 |
| Total workers employed in Industrial and Trade Occupations: (3) | 286,742 |
| Total workers employed in Other Occupations: (4) | 4,122 |

# Step 1: Select data variable of interest

TOD Database  Log Out  User Guide

Reports | Custom Report

**Reports**

**Select a report below or build a custom report.**

- Auto and Non-Auto Commute to Work by Industry
- Densities
- Employment (2002 - 2008)
- Household Age
- Household Income
- Household Type by Income
- Housing + Transportation Affordability Index
- Journey to Work
- Journey to Work by Public Transportation
- Mode Share for Persons with Disability
- Population and Employment
- Race
- Tenure
- Vehicle Ownership
- Vehicles per Workers for Households Under Poverty Status

# Step 2: Select geographic areas of interest

TOD Database  Log Out  User Guide

eland  Region  Transit Zone: .25 mile .5 m

Transit
GCRTA

## Geographies

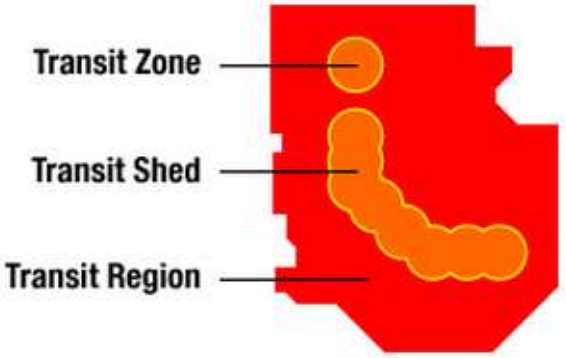
### Station Selection

☐ Transit Zones for Selected Stations

The buffer around each selected station.

☐ Transit Shed for Selected Stations

The aggregate of all buffers around selected stations (up to 10 stations).




### Regional Geographies

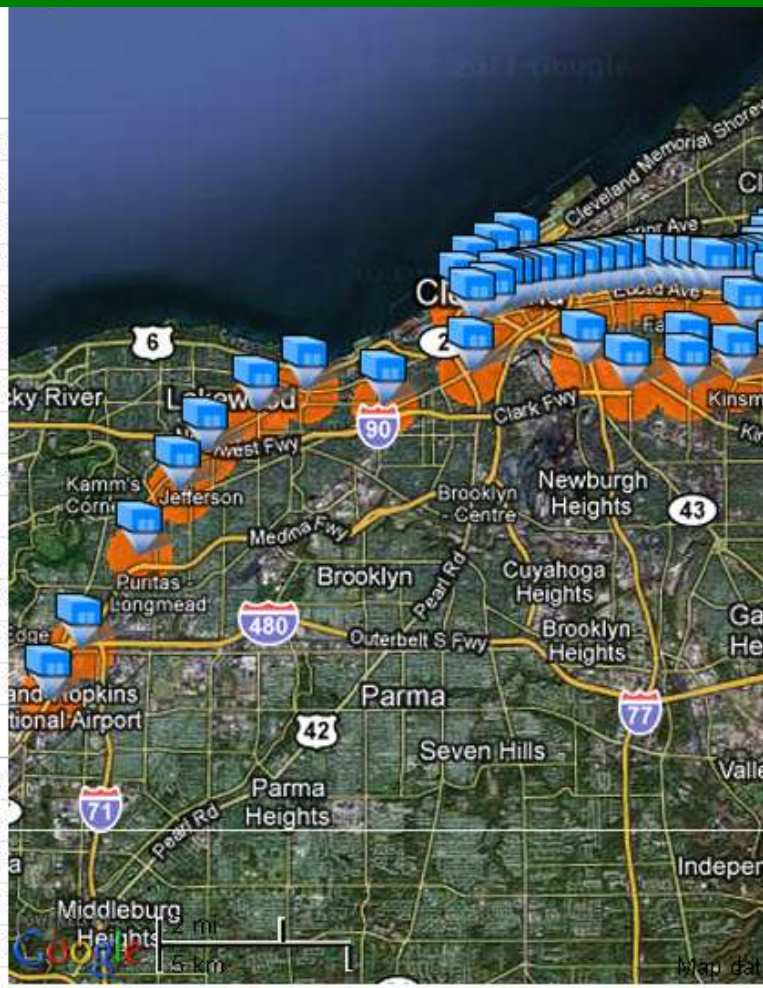
- ☑ Transit Region
- ☐ Transit Shed for all Existing and Potential Stations
- ☐ Transit Shed for all Potential Stations
- ☑ Transit Shed for all Existing Stations
- ☐ GCRTA Transit Shed
  - ☐ Blue Line Transit Shed
  - ☐ Green Line Transit Shed
  - ☐ Health Line BRT Transit Shed
  - ☐ Red Line Transit Shed
  - ☐ Waterfront Line Transit Shed

d Transit R
l Jobs: (1)
l Jobs: (2)
l Jobs: (3)

# Step 3: Click report, Download Excel file

View as: Table | **List** | Download List

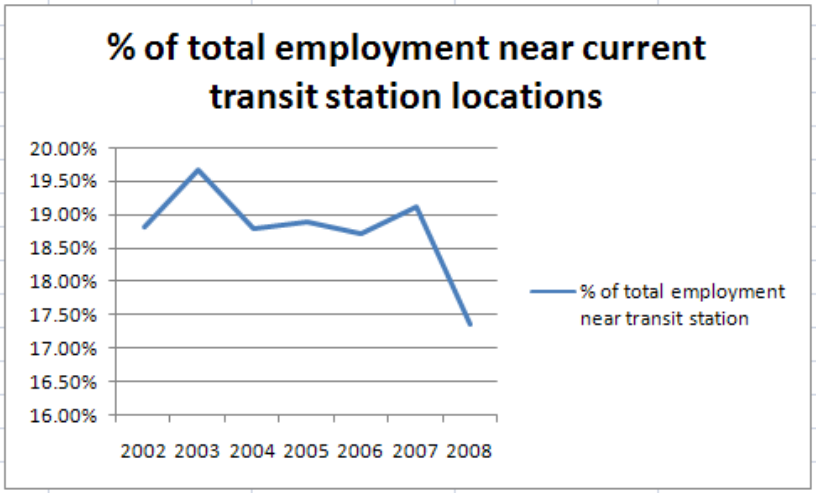
| Cleveland Transit Region: | |
|---|---|
| 2002 Total Jobs: (1) | 1,060,879 |
| 2003 Total Jobs: (2) | 1,068,588 |
| 2004 Total Jobs: (3) | 1,060,536 |
| 2005 Total Jobs: (4) | 1,065,353 |
| 2006 Total Jobs: (5) | 1,070,079 |
| 2007 Total Jobs: (6) | 1,071,478 |
| 2008 Total Jobs: (7) | 1,039,769 |
| 2002 Jobs per Acre: (8) | 0.61 |
| 2003 Jobs per Acre: (9) | 0.62 |
| 2004 Jobs per Acre: (10) | 0.61 |
| 2005 Jobs per Acre: (11) | 0.62 |
| 2006 Jobs per Acre: (12) | 0.62 |
| 2007 Jobs per Acre: (13) | 0.62 |
| 2008 Jobs per Acre: (14) | 0.60 |
| **GCRTA .5 Mile Transit Shed: GCRTA 5 Lines; 81 Stations** | |
| 2002 Total Jobs: (1) | 199,582 |
| 2003 Total Jobs: (2) | 210,133 |
| 2004 Total Jobs: (3) | 199,188 |
| 2005 Total Jobs: (4) | 201,295 |
| 2006 Total Jobs: (5) | 200,120 |
| 2007 Total Jobs: (6) | 204,711 |
| 2008 Total Jobs: (7) | 180,458 |
| 2002 Jobs per Acre: (8) | 11.52 |
| 2003 Jobs per Acre: (9) | 12.13 |
| 2004 Jobs per Acre: (10) | 11.50 |
| 2005 Jobs per Acre: (11) | 11.62 |
| 2006 Jobs per Acre: (12) | 11.55 |
| 2007 Jobs per Acre: (13) | 11.82 |
| 2008 Jobs per Acre: (14) | 10.42 |



# Step 4: Calculate % of employment within transit shed, by year

tod_database_download.xls - Microsoft Excel

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | **Buffer** | **2002 Total Jobs (1)** | **2003 Total Jobs (2)** | **2004 Total Jobs (3)** | **2005 Total Jobs (4)** | **2006 Total Jobs (5)** | **2007 Total Jobs (6)** | **2008 Total Jobs (7)** |
| 2 | Cleveland Transit Region | 1,060,879 | 1,068,588 | 1,060,536 | 1,065,353 | 1,070,079 | 1,071,478 | 1,039,769 |
| 3 | Cleveland .5 Mile Transit Shed for Existing Stations | 199,582 | 210,133 | 199,188 | 201,295 | 200,120 | 204,711 | 180,458 |
| 4 | | | | | | | | |
| 5 | | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** |
| 6 | % of total employment near transit station | 18.81% | 19.66% | 18.78% | 18.89% | 18.70% | 19.11% | 17.36% |

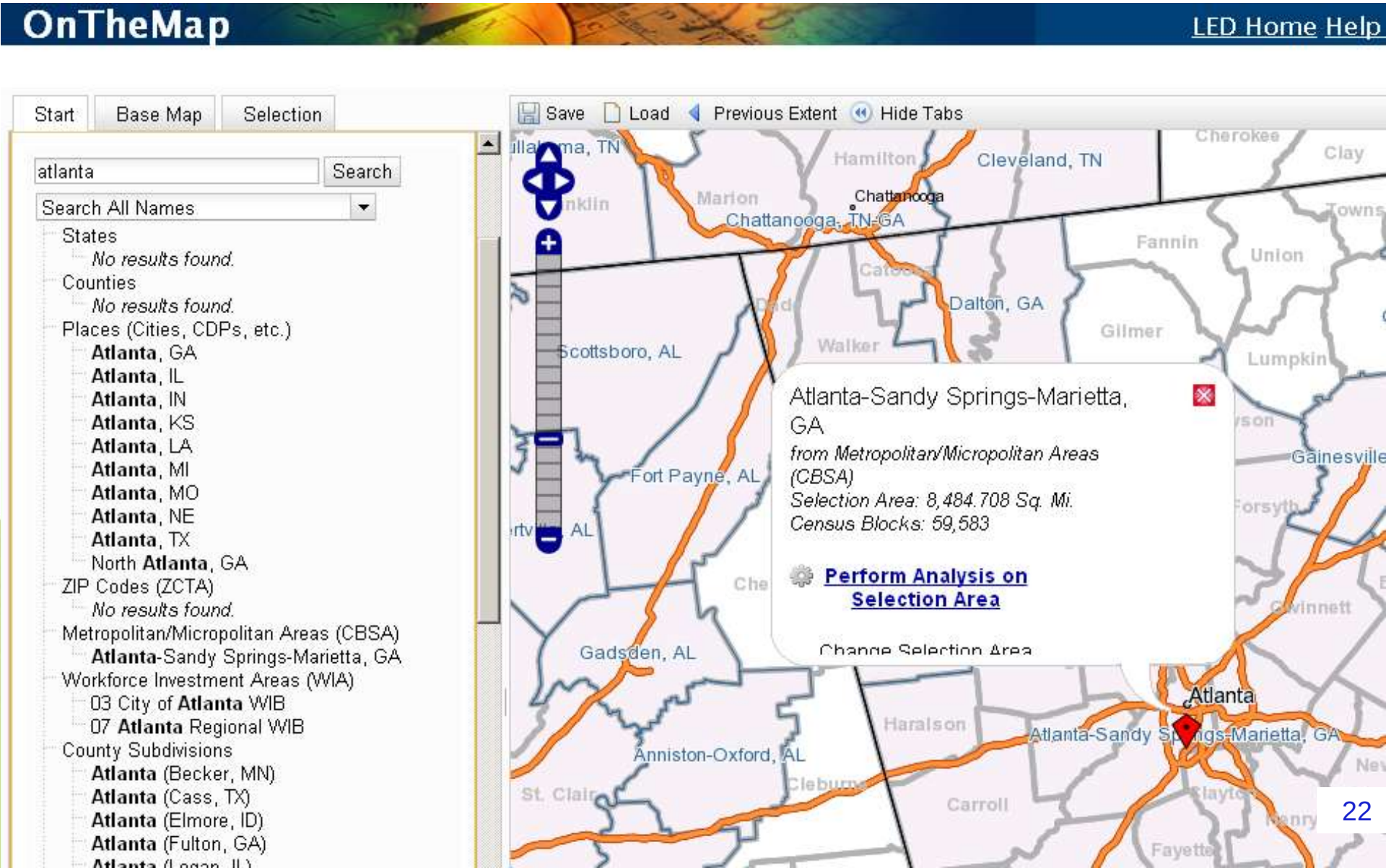



Note: This tool provides stats for transit station that existed in 2010. It does not take into account the year transit service was initiated at those station locations.

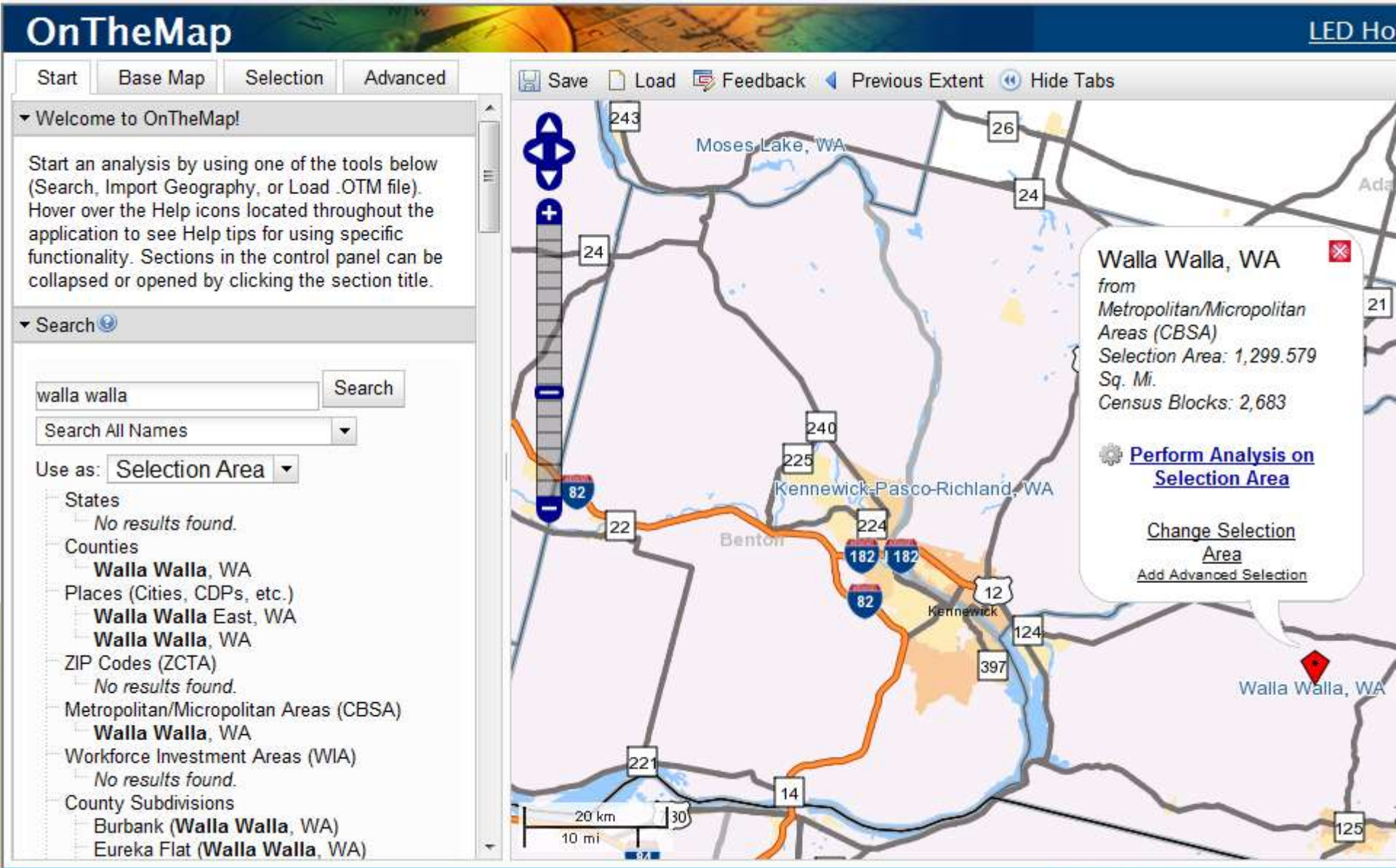
# Other uses of TOD Database

- Measure population near transit
- Measure housing affordability near transit
- Download detailed statistics for individual station areas
- Evaluate station areas for TOD suitability *or* evaluate performance in TOD station areas
  - See Performance-Based TOD Typology Guidebook
  - See also case studies in TOD Database User Guide

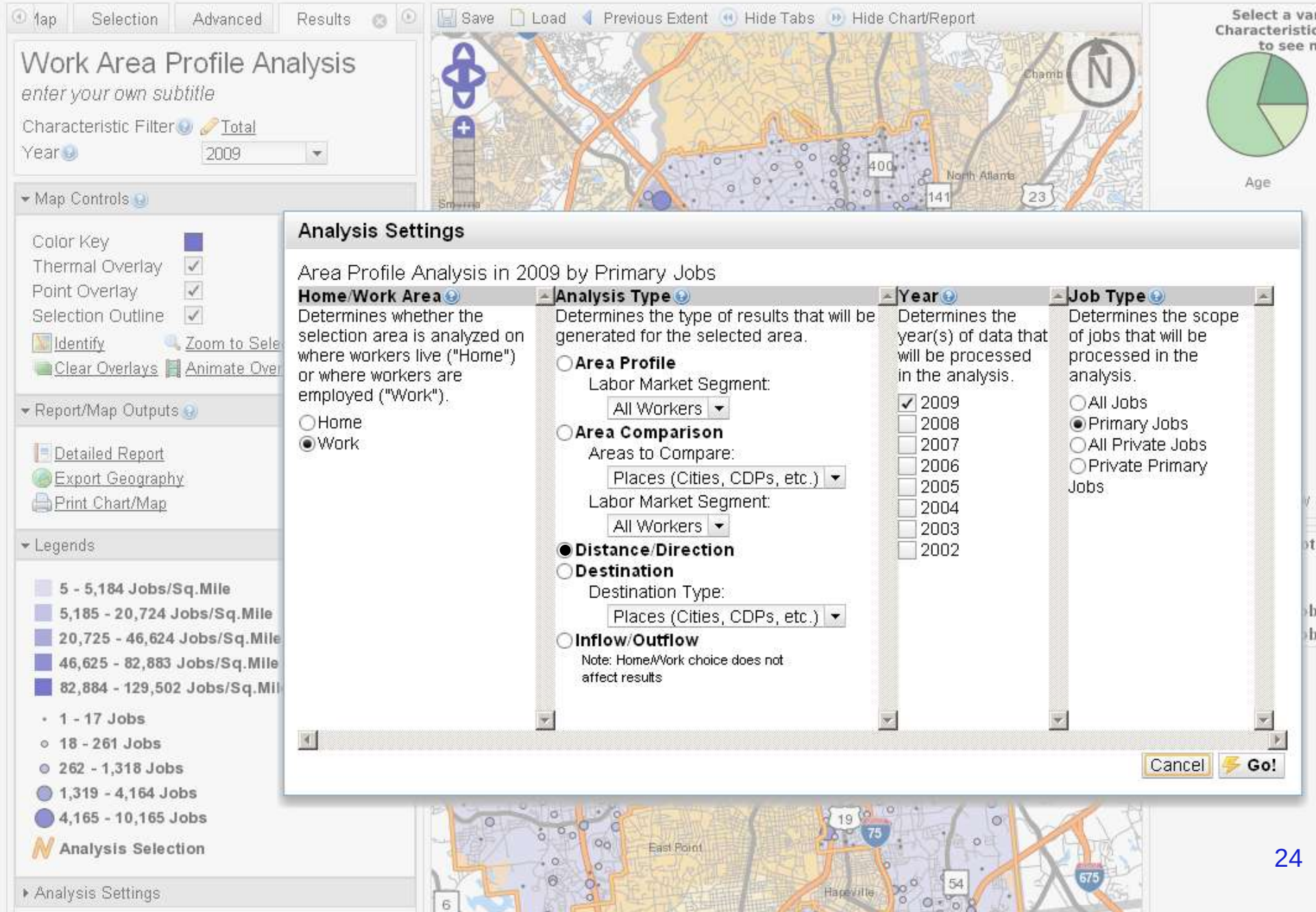
| Performance Measure: | **Distance Traveled to Work** |
|---|---|
| Tool: | On The Map |



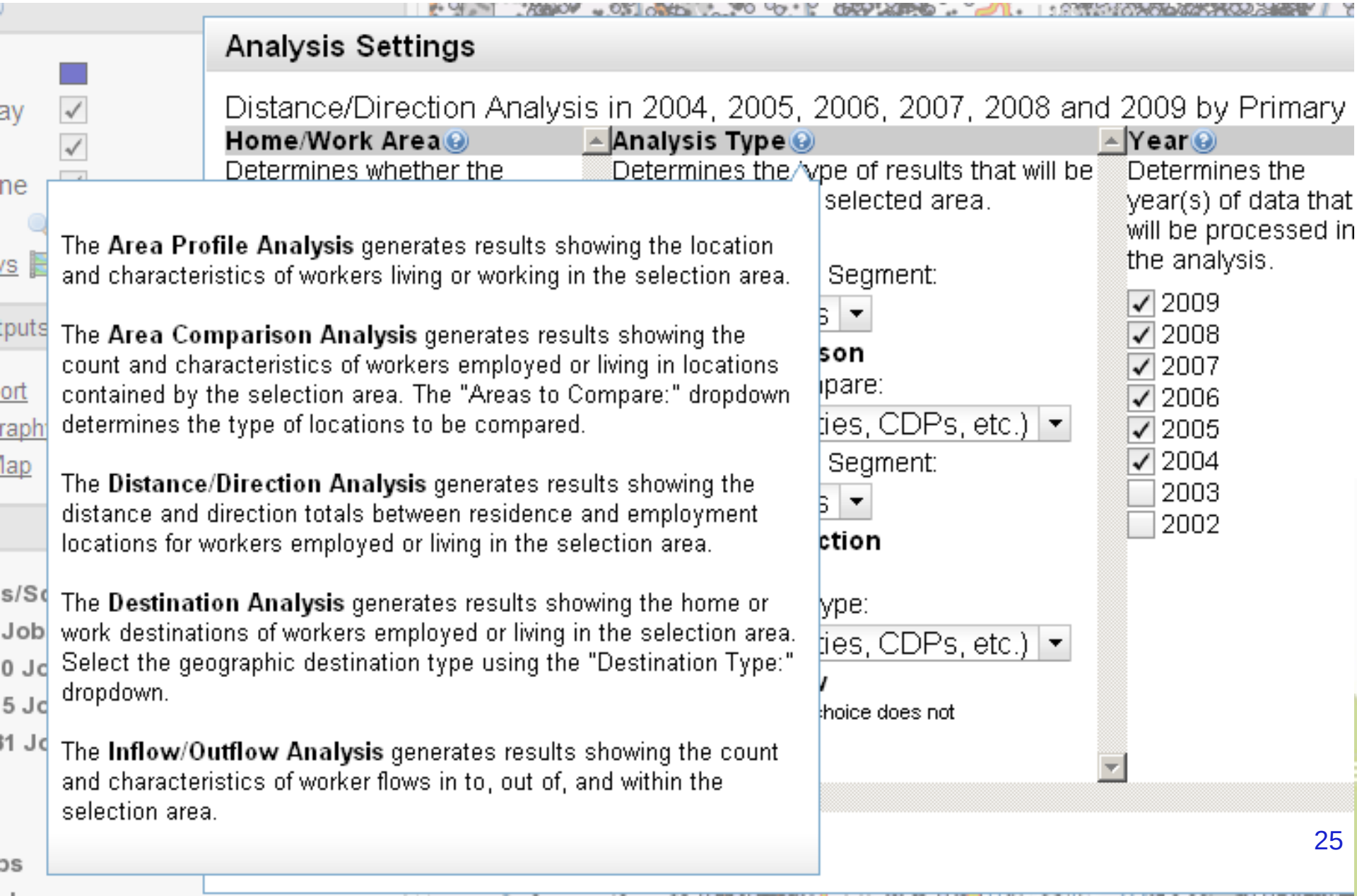
# Step 1: Select geography of interest



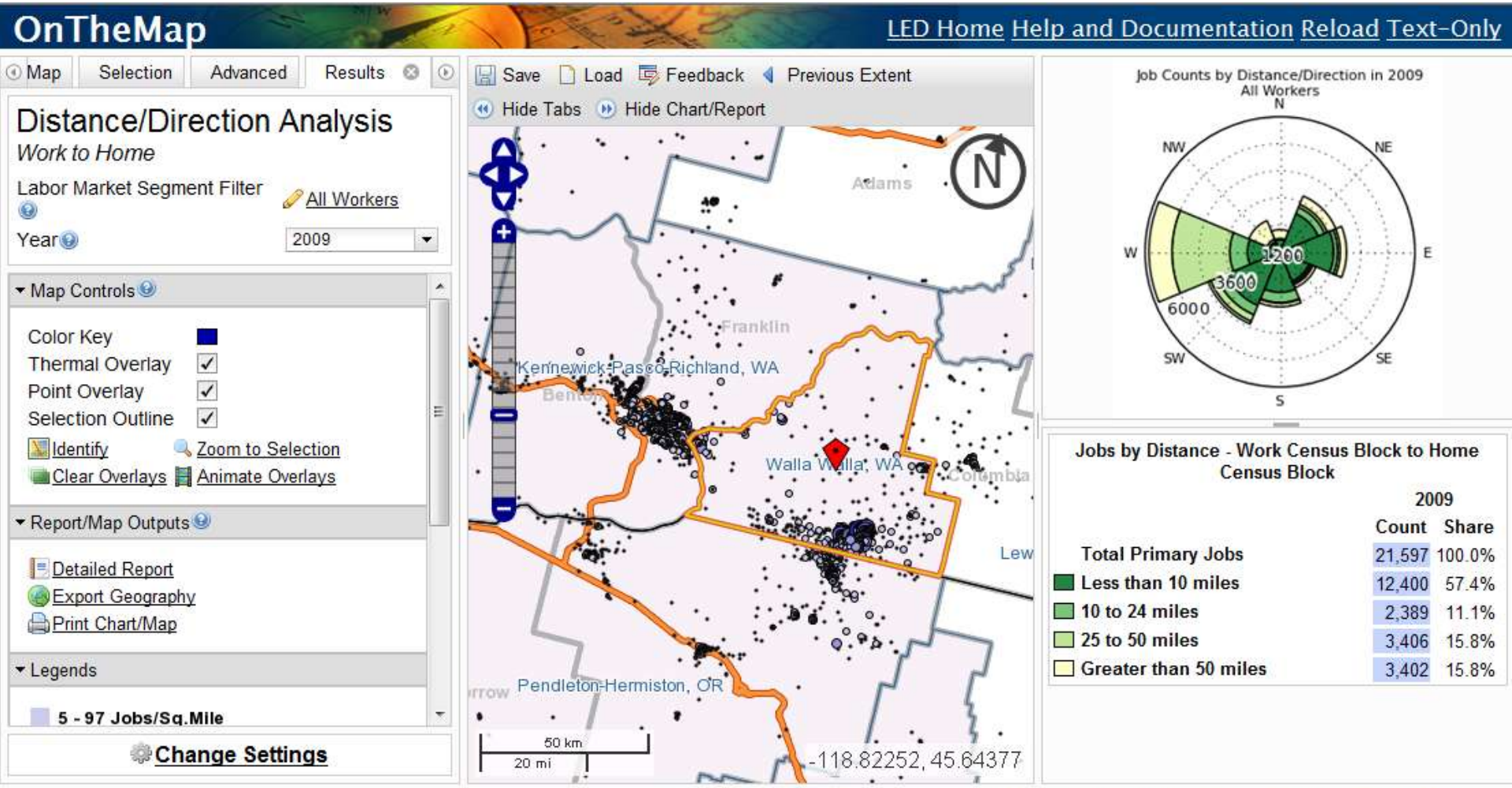
# Step 2: Choose analysis type



# Descriptions of Analysis Types Available



# Step 3: Wait for results



# Step 4: Generate “detailed report”

**Detailed Report View**

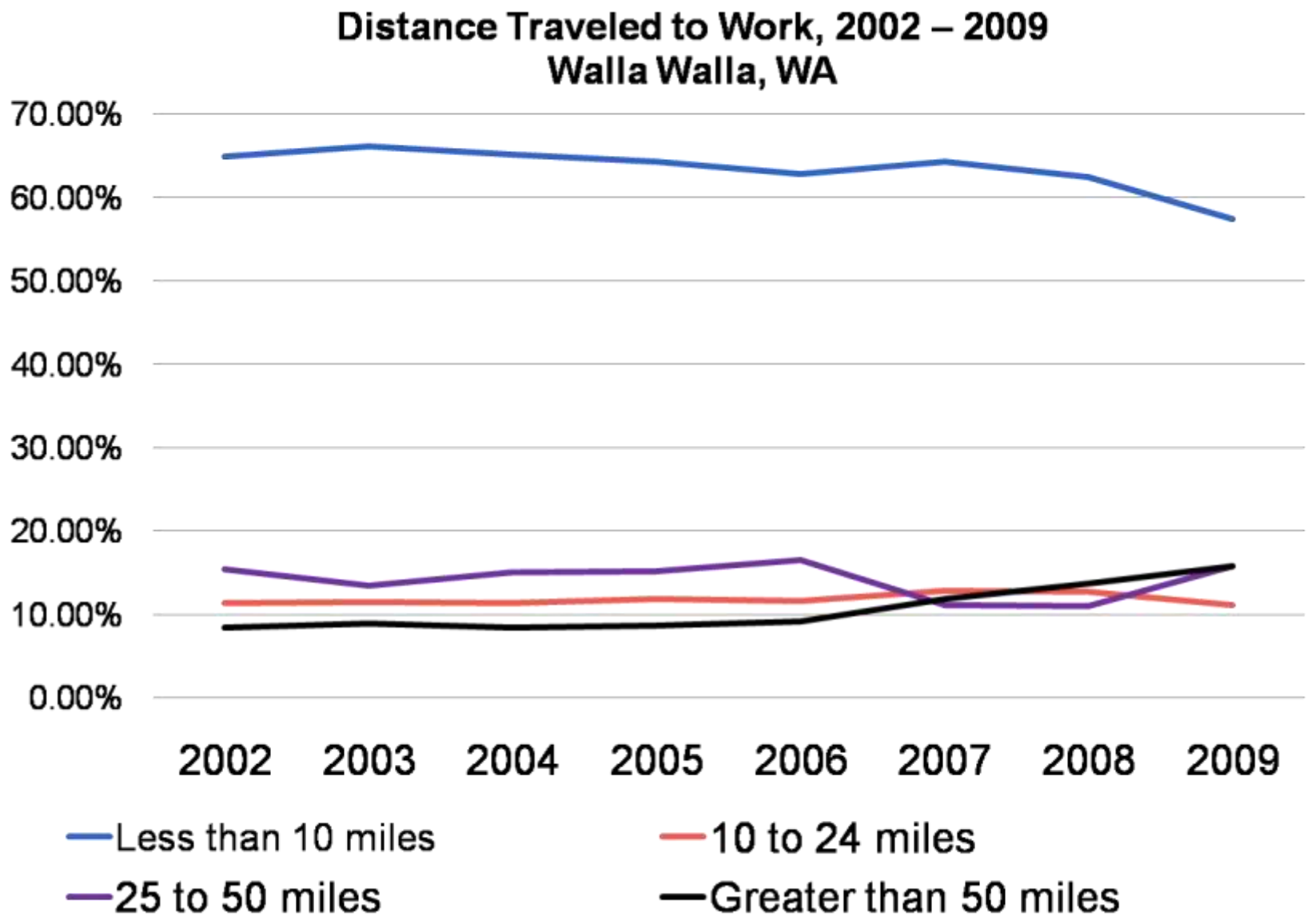
Export to PDF | Export to XLS | Export to HTML

## Distance/Direction Report - Work Census Block to Home Census Block

**Job Counts in Home Blocks by Distance Only**

| | 2009 | | 2008 | | 2007 | | 2006 | | 2005 | | 2004 | | 2003 | | 2002 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Count | Share | Count | Share | Count | Share | Count | Share | Count | Share | Count | Share | Count | Share | Count | Share |
| Total Primary Jobs | 21,597 | 100.0% | 22,720 | 100.0% | 21,690 | 100.0% | 21,872 | 100.0% | 21,558 | 100.0% | 21,185 | 100.0% | 20,844 | 100.0% | 20,658 | 100.0% |
| Less than 10 miles | 12,400 | 57.4% | 14,208 | 62.5% | 13,955 | 64.3% | 13,732 | 62.8% | 13,887 | 64.4% | 13,823 | 65.2% | 13,805 | 66.2% | 13,403 | 64.9% |
| 10 to 24 miles | 2,389 | 11.1% | 2,881 | 12.7% | 2,767 | 12.8% | 2,543 | 11.6% | 2,542 | 11.8% | 2,395 | 11.3% | 2,400 | 11.5% | 2,345 | 11.4% |
| 25 to 50 miles | 3,406 | 15.8% | 2,509 | 11.0% | 2,403 | 11.1% | 3,604 | 16.5% | 3,261 | 15.1% | 3,182 | 15.0% | 2,786 | 13.4% | 3,182 | 15.4% |
| Greater than 50 miles | 3,402 | 15.8% | 3,122 | 13.7% | 2,565 | 11.8% | 1,993 | 9.1% | 1,868 | 8.7% | 1,785 | 8.4% | 1,853 | 8.9% | 1,728 | 8.4% |

Close


Distance Traveled to Work, 2002 – 2009
Walla Walla, WA
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
2002
2003
2004
2005
2006
2007
2008
2009
Less than 10 miles
10 to 24 miles
25 to 50 miles
Greater than 50 miles

# Free Online Tools for Mapping Baseline Conditions

- Brookings: Metropolitan Transit  Access
- Housing + Transportation Index
- Walkscore
- USDA Food Desert Locator
- ChangeMatters (*LandSat imagery viewer*)
- NYT: Mapping America (American Community Survey data viewer)

***Benefits***:
- Relatively easy to use and interpret
- Great way to visually analyze current conditions in specific locations

***Drawbacks***:
- Most provide only one snapshot in time
- Data cannot be downloaded for further analysis

# Technical Assistance Opportunity

- EPA's Office of Sustainable Communities is seeking to "pilot test" performance measures in 4 communities
- Selected communities will receive technical assistance during summer/fall 2011
- Selected communities are expected to invest staff time to support performance measurement activity during this period
- EPA seeks volunteer communities in the following categories:
  - Large regional agencies or cities (population > 300,000)
  - Small/Medium-sized regional agencies (100,000 – 300,000)
  - Large suburban municipalities (population 100,000 to 500,000)
  - County or regional agency covering a rural areas (with towns less than 50,000)

# How to Express Interest in Technical Assistance Opportunity

- Send a letter of interest to Ramsey.Kevin@epa.gov that includes the following information:
  - Name of MPO/municipality/county seeking assistance
  - Name and contact information for lead staff person who will devote time to supporting performance measurement analysis
  - A brief description of the kinds of issues that your community is most interested in exploring through performance measurement as well as the challenges you have faced in your efforts to do so (data availability, technical capacity, etc.).

# Other Performance Measurement Resources

- http://www.SustainableCommunities.gov
  - Includes resource page on performance measurement that will be updated with new resources as they become available
- EPA: Guide to Sustainable Transportation Performance Measures (to be released very soon)
- Smart Mobility 2010: A Call to Action for the New Decade
- FTA: Transit Performance Measurement
- FHWA: Highway Performance Measurement
- CTOD: Performance-Based Transit-Oriented Development Typology Guidebook
- Bureau of Transportation Statistics Livability Program

# Questions or Comments are Welcome!

Contact info:

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202.566.1153

*The following slides will not be covered in the 5/26 webinar.*

# Additional Resources: Performance Measure Examples

# Principle #2 – Promote Equitable Affordable Housing

*Expand access to location and energy efficient housing choices for people of all ages, incomes, races, and ethnicities*

| Strategies: | Performance measures: | Indicators of progress: | Broad outcomes: |
|---|---|---|---|
| Implement policy to promote housing affordability near transit and employment centers | # of affordable homes/rentals "well served" by transit | % of low income households "well served" by transit | Reduced residential segregation by income |
| | # of affordable homes/rentals near emp. centers | | Lower combined cost of housing & transportation |
| Focus new residential development in areas well served by transit and near employment centers | % of new homes "well served" by transit | % of low income HH w/in 30min commute of employment centers | Improved public health |
| | % of new homes built near emp. centers | | Reduced oil dependence |
| | | | Improved air quality |
| | | | Reduced GHG emissions |

# Performance Measure Example

**(Source: ICF International,** *fgallivan@icfi.com)*

## Transit Accessible Homes and Jobs

### Example Metrics:

- Percent of population and employment within 0.5 miles of high capacity transit.
- Number of households within 30-minute transit ride of major employment center.

**Metric Variations:** Calculate metrics for low-income populations versus other populations.

### Data Sources:

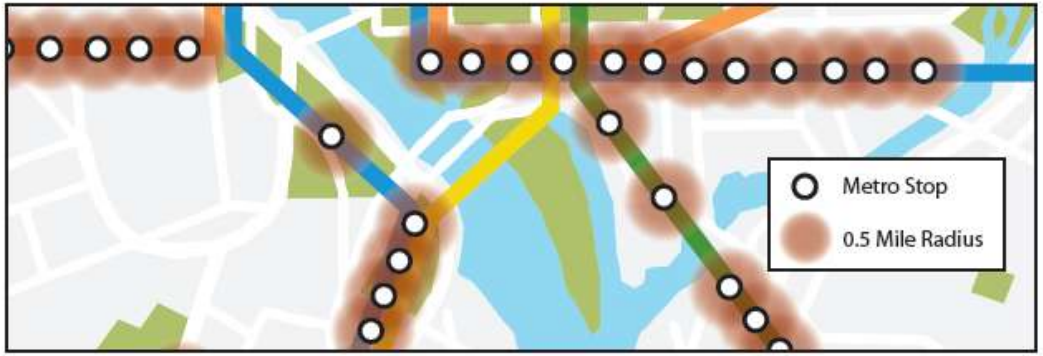
| Data Point | Data Source |
|---|---|
| Location of Rail Stations | National TOD Database |
| Transit Level of Service | Google Transit Feed Service (limited data) |
| Housing and Population Counts | U.S. Census; American Community Survey |
| Job Counts | Longitudinal Employer-Household Dynamics |

### Measurement Challenges:

- Level of service information is not consistently available.
- No single national source for data on bus routes. Forecasting locations for new bus stops is challenging.
- Estimating transit travel times requires a travel demand model with a robust transit network.

### Policies to Improve Performance:

- Transit system expansion and improvements in level of service.
- Land use policies that cluster development around transit stations and stops.



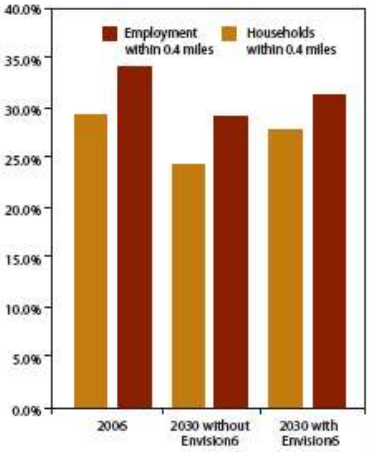

### Examples From MPO Decision Making:

**San Diego Association of Governments: Accessibility Measures**

| Goals and Performance Measures | Long Range Transportation Plan Scenarios | | | | |
|---|---|---|---|---|---|
| | Current (2006) | Revenue Constrained (2030) | Reasonably Expected (2030) | Smart Growth RE (2030) | No Build (2030) |
| Percent of work and higher education trips accessible in 30 minutes in peak periods | 61% | 54% | 56% | 57% | 53% |
| Percent of work and higher education trips accessible in 30 minutes in peak periods by mode | | | | | |
| Auto | 65% | 57% | 58% | 60% | 55% |
| Transit | 10% | 13% | 15% | 16% | 10% |
| Carpool | 67% | 64% | 68% | 70% | 59% |
| Percent of non-work-related trips accessible in 15 minutes | 66% | 63% | 63% | 64% | 62% |
| Percent of non-work-related trips accessible in 15 minutes by mode | | | | | |
| Auto | 67% | 63% | 63% | 64% | 63% |
| Transit | 4% | 6% | 7% | 7% | 4% |
| Carpool | 68% | 66% | 66% | 67% | 64% |

Source: 2030 San Diego Regional Transportation Plan

**Atlanta Regional Commission: Share of Population and Employment Within Walking Distance of Transit**




Source: ARC 2030 Regional Transportation Plan

# Performance Measure Example

**(Source: ICF International,** *fgallivan@icfi.com)*

## Preserving Open Space

### Example Metrics:

- Percent of new housing units built on previously developed land.
- Percent of new commercial floorspace built on previously developed land.

### Metric Variations:

- Constrained lands consumed for new transportation infrastructure.
- Number of residential units and square feet of non-residential space near agricultural and natural resource lands.
- Acres of farmland converted to urban uses.


### Data Sources:

| Data Point | Data Source |
|---|---|
| Current/ Previous Land Use | National Land Cover Database |
| Location of New Development | Tax Assessor Data; Building Permit Data |

### Measurement Challenges:

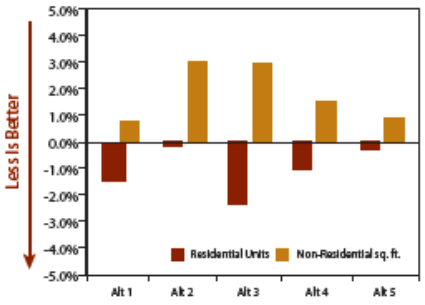
- In long range transportation planning, land use forecasts generally do not vary between alternatives.
- No single source for spatial data on new construction.

### Policies to Improve Performance:

- Establish urban growth boundaries.
- Require concurrency between land development and infrastructure availability.
- Require maintenance of existing infrastructure before construction of new infrastructure.
- Community-based long-term land use visioning processes.

### Examples From MPO Decision Making:

**Puget Sound Regional Council: Development on Parcels in Proximity to Resource and Agricultural Lands (Change from 2040 Baseline)**




Source: PSRC Transportation 2040

**Mid-Ohio Regional Planning Commission: Comparison of Transportation and Land Use Alternatives**

| Scenarios | VMT vs. Current | Total Sq. Miles Developed | % New on Greenfields | |
|---|---|---|---|---|
| | | | Housing | Jobs |
| Trend | 45% | 1,543 | 84% | 91% |
| Shifting Inward | 40% | 1,440 | 84% | 91% |
| Shifting Inward with Increased Transit | 31% | 1,370 | 73% | 61% |
| Aggressively Inward | 21% | 1,186 | 51% | 22% |

Source: MORPC Regional Fact Book (August 2004)

# Performance Measure Example

**(Source: ICF International, *fgallivan@icfi.com*)**

## Promoting Alternative Modes Over Single Occupancy Vehicles

### Example Metrics:

- Bicycle , pedestrian, and transit mode share.
- VMT per capita.
- Average Vehicle Occupancy.

### Metric Variations:

- Bicycle and pedestrian level of service.

### Data Sources:

| Data Point | Data Source |
|---|---|
| Commute Trips—Mode and Length | U.S. Census; American Community Survey |
| All Trips—Mode and Length | Local Travel Surveys |
| System-Level Transit Ridership | National Transit Database |
| Vehicle Miles Traveled | Highway Statistics (appropriate for some isolated urban areas); Travel Demand Models |

### Measurement Challenges:

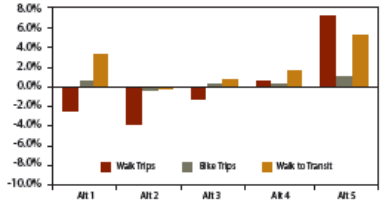
- Highway Statistics data on VMT includes pass-through VMT from surrounding communities.
- Most travel models have limited ability to represent trips by alternative modes.
- Most travel models have limited ability to capture the impact of small-scale land use changes or improvements to bicycle and pedestrian facilities.

### Policies to Improve Performance:

- Improvements to bicycle and pedestrian environments and transit systems.
- Employer-based or residence-based transportation demand management programs.
- Transportation pricing.
- Land use changes that improve access to alternative modes.

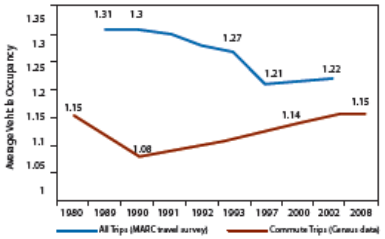
### Examples from MPO Decision Making:

**Puget Sound Regional Council: Change in Walk and Bike Trips as Percent of Total Non-Motorized Trips from 2040 Baseline**



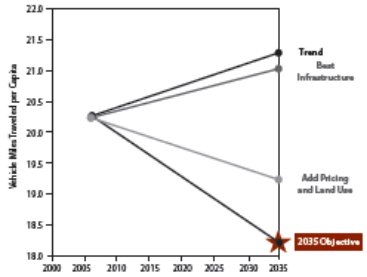

Source: PSRC Transportation 2040

**Mid-America Regional Council: Vehicle Occupancy Rate Comparison**




Source: MARC Transportation Outlook 2040

**Metropolitan Transportation Commission: VMT per Capita Under Investment and Policy Scenarios**




Source: MTC Transportation 2035

# Performance Measure Example
**(Source: ICF International, *fgallivan@icfi.com*)**

## Household Transportation Costs

### Example Metrics:

$$\text{Average commute cost per worker} = \left(\text{Average drive-alone distance per worker} \times \text{Drive-alone cost per mile}\right) + \left(\text{Average carpool distance per worker} \times \text{Carpool cost per mile}\right) + \left(\text{Average transit trips per worker} \times \text{Transit trip cost}\right)$$

### Metric Variations:

- Include non-commute trips.
- To represent affordability, calculate transportation costs relative to income.
- To capture the tradeoff between housing and transportation expenditures, include housing costs.

### Datas Sources:

| Data Point | Data Source |
|---|---|
| Commute Trips—Mode and Length | U.S. Census; American Community Survey |
| All Trips—Mode and Length | Local Travel Surveys |
| Cost Factors | Transportation Energy Databook; National Transit Database |

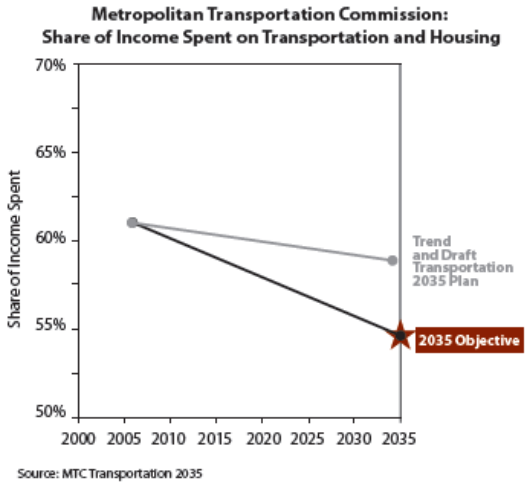
### Measurement Challenges:

- Little empirical data on non-work trips available by city or region. Must typically be modeled.
- Little to no data available on parking costs.
- For affordability, must have data on household incomes.
- Difficult or impossible to forecast changes in housing costs.

### Policies to Improve Performance:

- Provide and promote lower cost modes of transportation.
- Promote housing closer to jobs for all income levels.

### Example From MPO Decision Making:



# Metric: % of new homes built near transit (or activity center)

| | |
|---|---|
| **Detailed description** | Percentage of all new homes built that are located within ½ mile of a "well served" transit stop (or "major activity center" in regions without regular transit service) |
| **Appropriate scale(s) of measurement** | • Regional *(ideal)*<br>• Municipal |
| **Key definitions** | • Well served transit stop/station (FTA)<br>• Major activity center |
| **Data Elements** | **Transit (2 options)**<br>• *Location of "well served" transit stops (local)*<br>• *Fixed guideway transit stop locations (TOD Database)*<br>**Home construction (2 options)**<br>• *Home construction or permit data (local)*<br>• *Housing units by block group (Census/ACS)* |

# Metric: Number of affordable homes near transit (or activity center)

| | |
|---|---|
| **Detailed description** | Number of housing units or rental units with cost/rent less than 30% of area median income (AMI) within ½ mile radius of a well served transit stop (or "major activity center" in regions without regular transit service) |
| **Appropriate scale(s) of measurement** | • Regional<br>• Municipal |
| **Key definitions** | • Well served transit stop/station (FTA)<br>• Major activity center<br>• Affordable home |
| **Data Elements** | **Transit** (see prior slide)<br>**Affordable homes:** *(all data from Census/ACS)*<br>• Homeowner-occupied housing costs<br>• Renter-occupied housing costs |

# Metric: Percentage of workers commuting by transit

| | |
|---|---|
| **Detailed description** | Percentage of all workers in an area who use transit as their primary mode of transportation to work |
| **Appropriate scale(s) of measurement** | • Regional<br>• Municipal<br>• Census Tract |
| **Data Elements** | • % of workers commuting by transit (Census/ACS) |
| **Tools needed for analysis** | • Census American Fact Finder |

# Metric: Transit trips per capita

| | |
|---|---|
| **Detailed description** | The total daily number of transit trips per resident. |
| **Appropriate scale(s) of measurement** | • Regional<br>• Municipal |
| **Data Elements** | • Number of annual unlinked transit trips for each transit agency<br>  • Source: http://www.ntdprogram.gov/ntdprogram/<br>• Resident population (by metro area or city)<br>  • Source: Decennial Census or American Community Survey |
| **Tools needed for analysis** | • Census American Fact Finder<br>• Spreadsheet or calculator |

# Metric: Percentage of workers commuting by bicycle

| | |
|---|---|
| **Detailed description** | Percentage of all workers in an area who use transit (or bicycle) as their primary mode of transportation to work |
| **Appropriate scale(s) of measurement** | • Regional<br>• Municipal<br>• Census Tract / TAZ |
| **Key definitions** | None |
| **Data Elements** | • % of workers commuting by transit (Census/ACS) |
| **Tools needed for analysis** | • Census American Fact Finder |

# Additional Resources:
# Common Data Sources

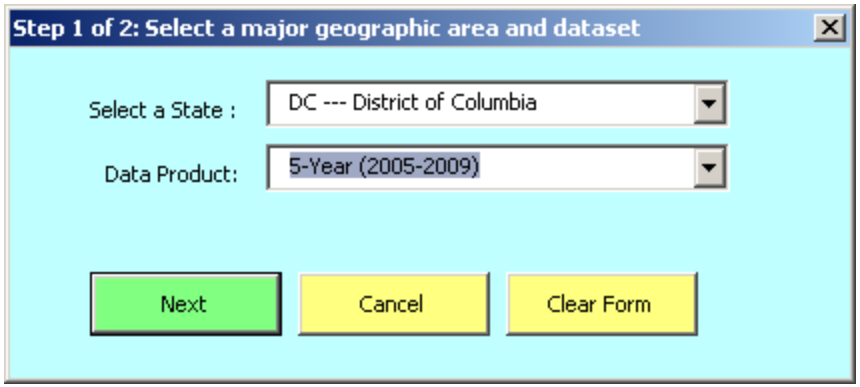
# American Community Survey (ACS) 5-Year Estimate

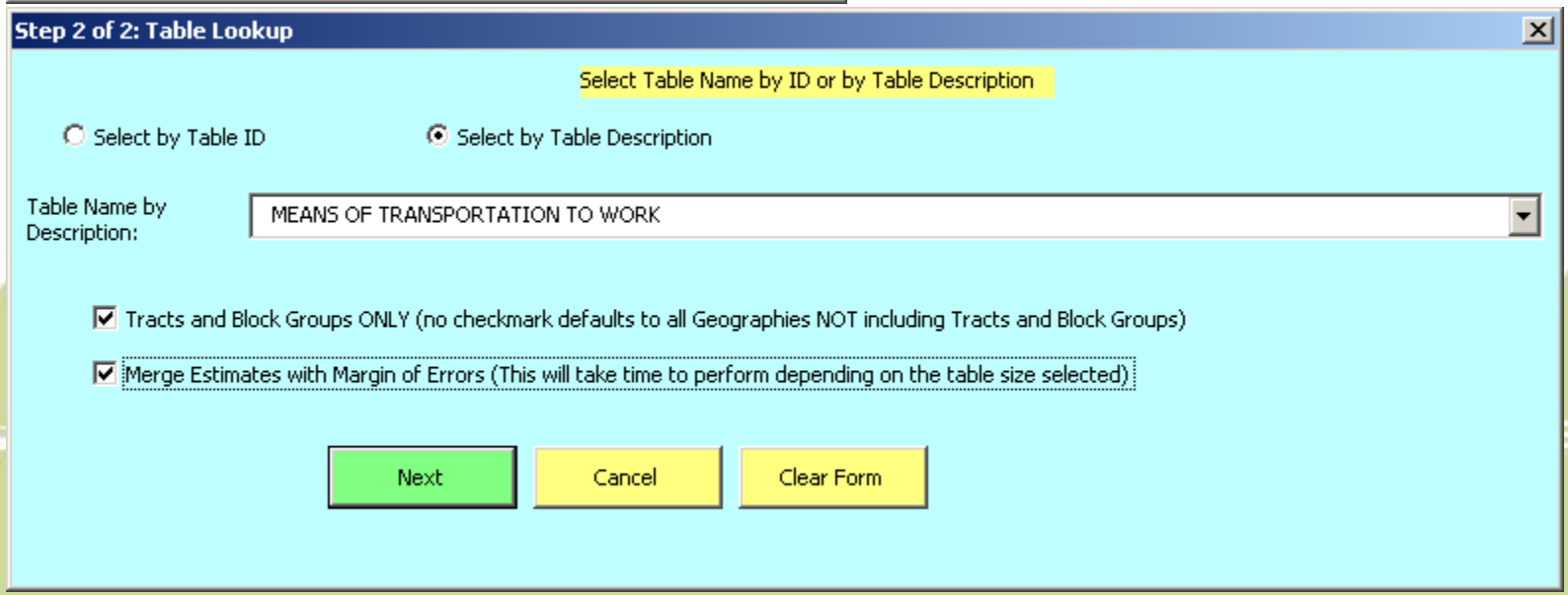
- New Census product
- Updated yearly, starting in 2010
- Data available for all census block groups in the U.S.
- Summary file retrieval tool available at:
  - http://www.census.gov/acs/www/data_documentation/summary_file/

# Census Summary File Retrieval Tool

Macro for use in Microsoft Excel 2007 or higher

http://www.census.gov/acs/www/data_documentation/summary_file/



# Some ACS Variables of Interest

*Transportation*

- Means of transportation to work

*Housing affordability*

- Selected monthly owner costs
- Gross rent
- Median household income

*Housing unit counts (e.g., for estimates of new construction)*

- Housing units

# Some Transit Data Sources

- Passenger counts by transit agency
  - National Transit Database
- Fixed-guideway transit stop locations
  - TOD Database (*station data available for download upon request*)
- Local area bus transit stops and service
  - Data only available locally. Many agencies are sharing data in GTFS format. GTFS data can be converted for analysis in GIS.

# Tools for Mapping Baseline Conditions

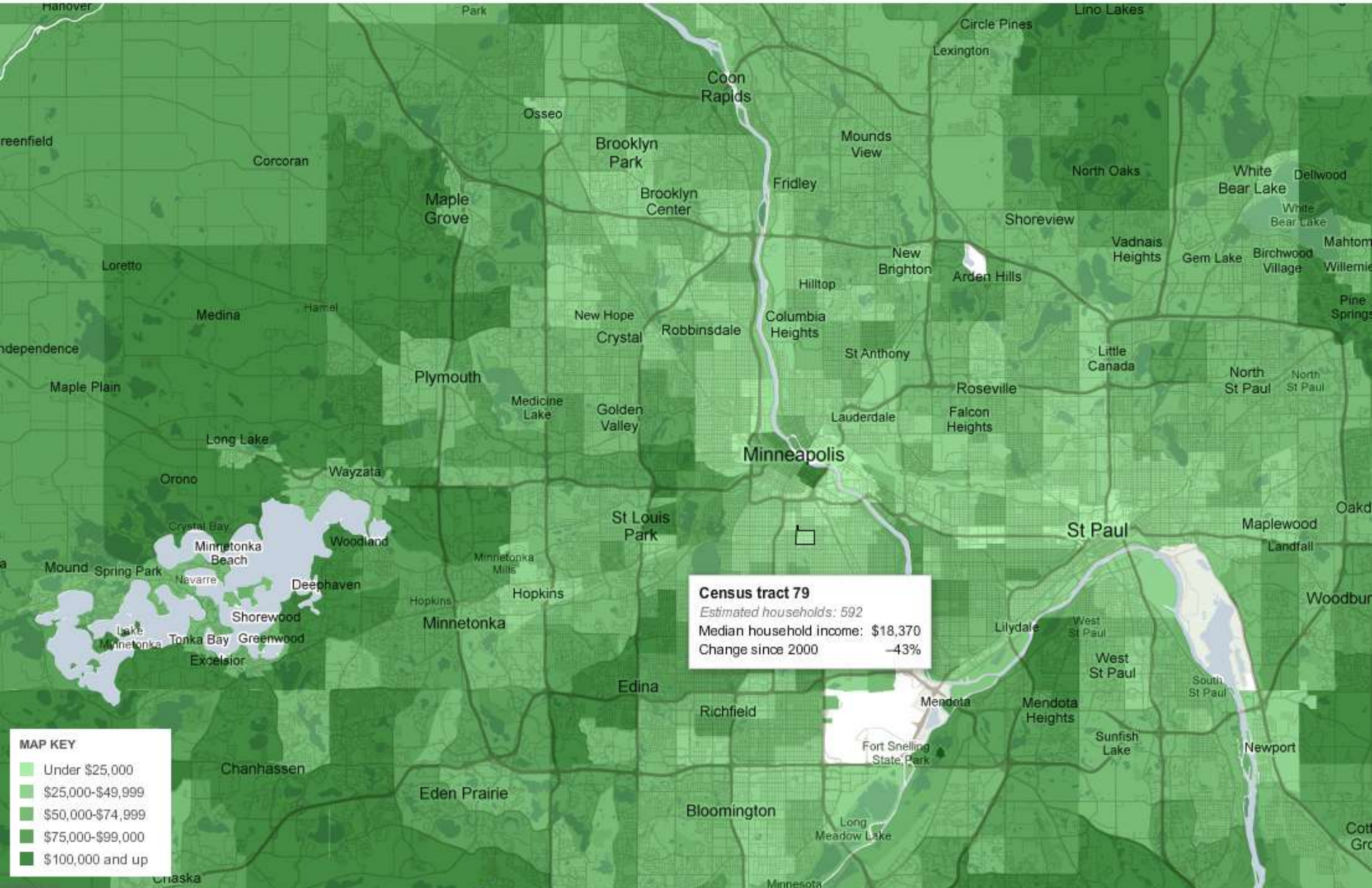
# Mapping America: Every City, Every Block

http://projects.nytimes.com/census/2010/explorer

Browse local data from the Census Bureau's American Community Survey, based on samples from 2005 to 2009. Because these figures are based on samples, they are subject to a margin of error, particularly in places with a low population, and are best regarded as estimates.

**Median household income**

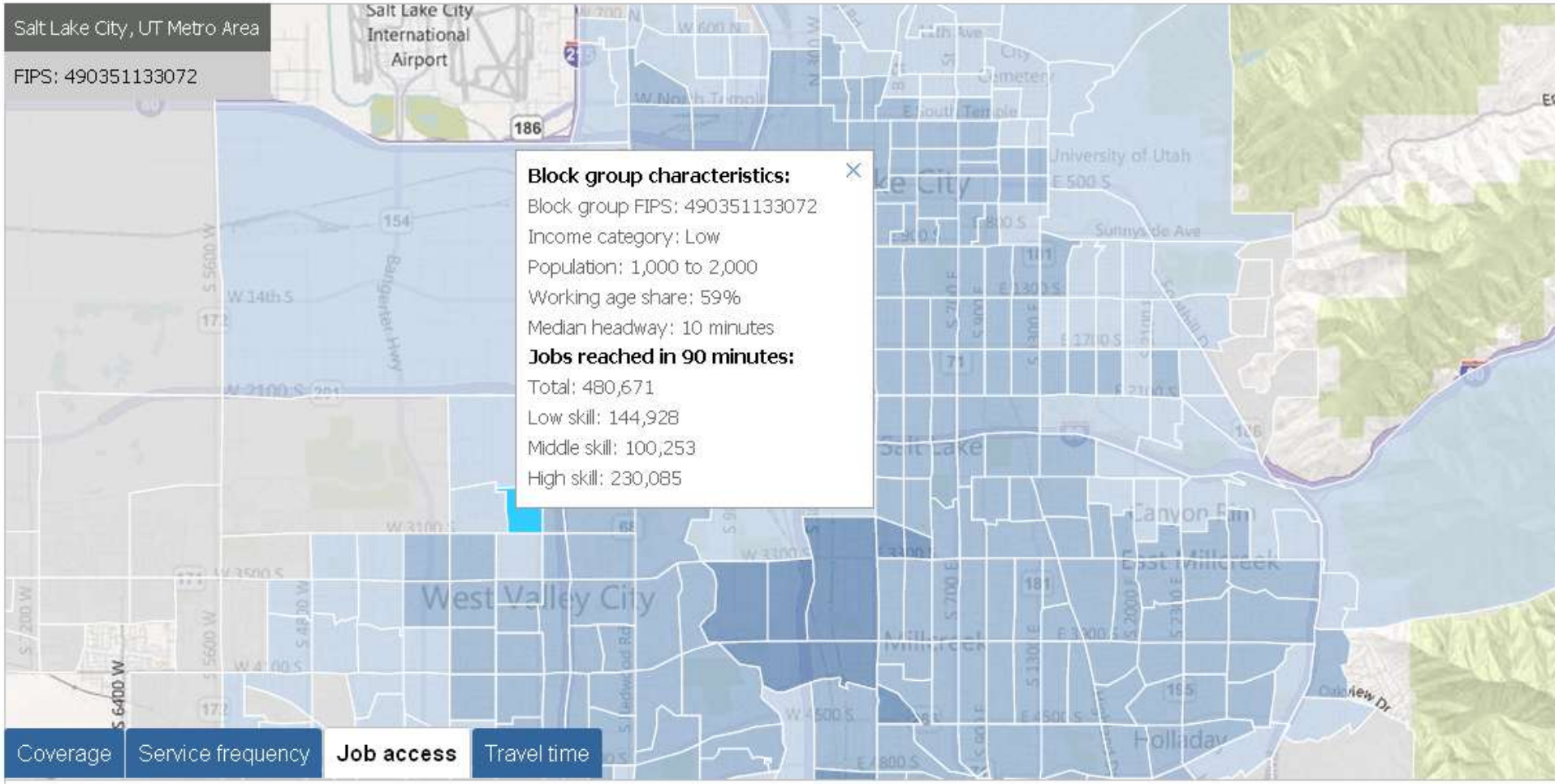
View More Maps | Minneapolis, MN | Go



# Metropolitan Transit Access: Job access

Share of jobs reachable in a set time

Metro area: Salt Lake City, UT  Address: Enter location




All | 0-20 | 20-40 | 40-60 | 60-80 | >80 %  In: 60 min  Income: All Incomes

**Average Jobs reached in 90 minutes (share of all metro jobs)**

Total: 391,860 (59% metro)
From low-income: 461,621 (69% metro)
From middle-income: 394,778 (59% metro)
From high-income: 314,763 (47% metro)

http://www.brookings.edu/metro/jobs_and_transit/map.aspx

H+T Index | Gas Cost Impacts | Greenhouse Gas Impacts | Custom Comparison

http://htaindex.cnt.org/

# Region: Fresno, CA

Region

**Typical Household:** Regional Median Income: **$34,960** Size: **2.5 People** Commuters: **1.2 Workers**

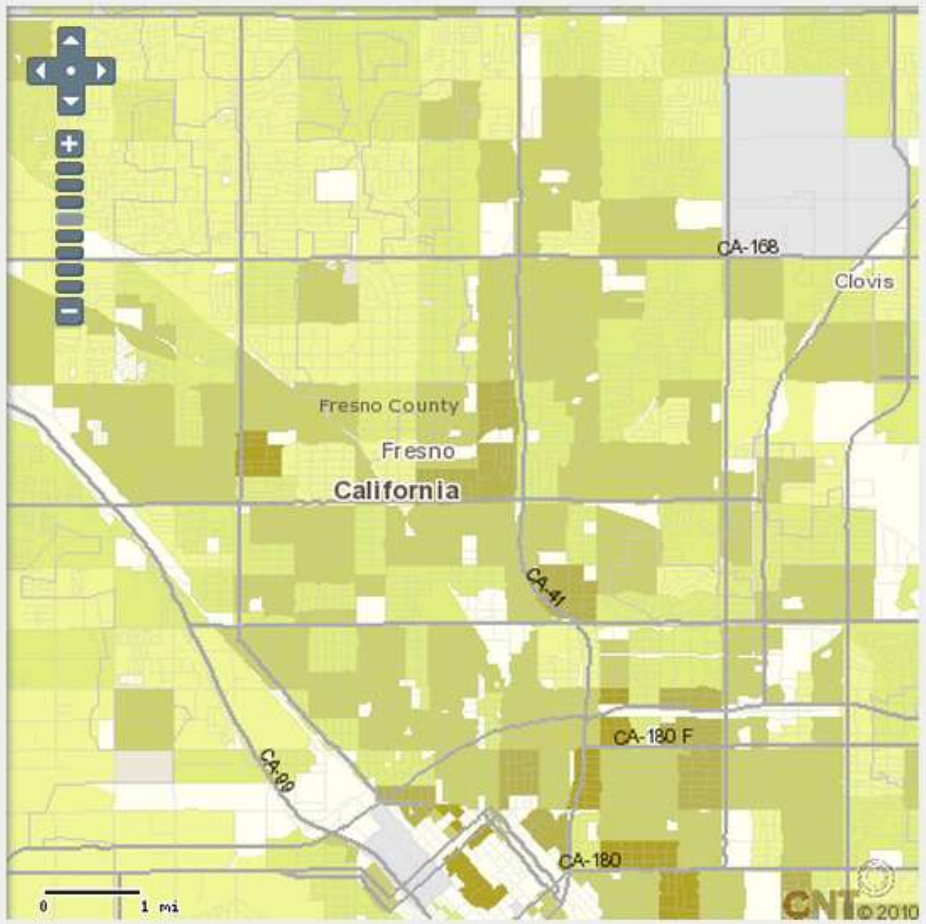
**Display:** Legend and Description Change

## Transit Ridership, % of Workers

Change

- Data Not Available
- Less than 1%
- 1 to 4%
- 4 to 8%
- 8 to 14%
- 14% and Greater

Transit Ridership represents the percentage of workers in a Block Group who utilize Public Transportation (Transit) as their primary mode of transportation to work.

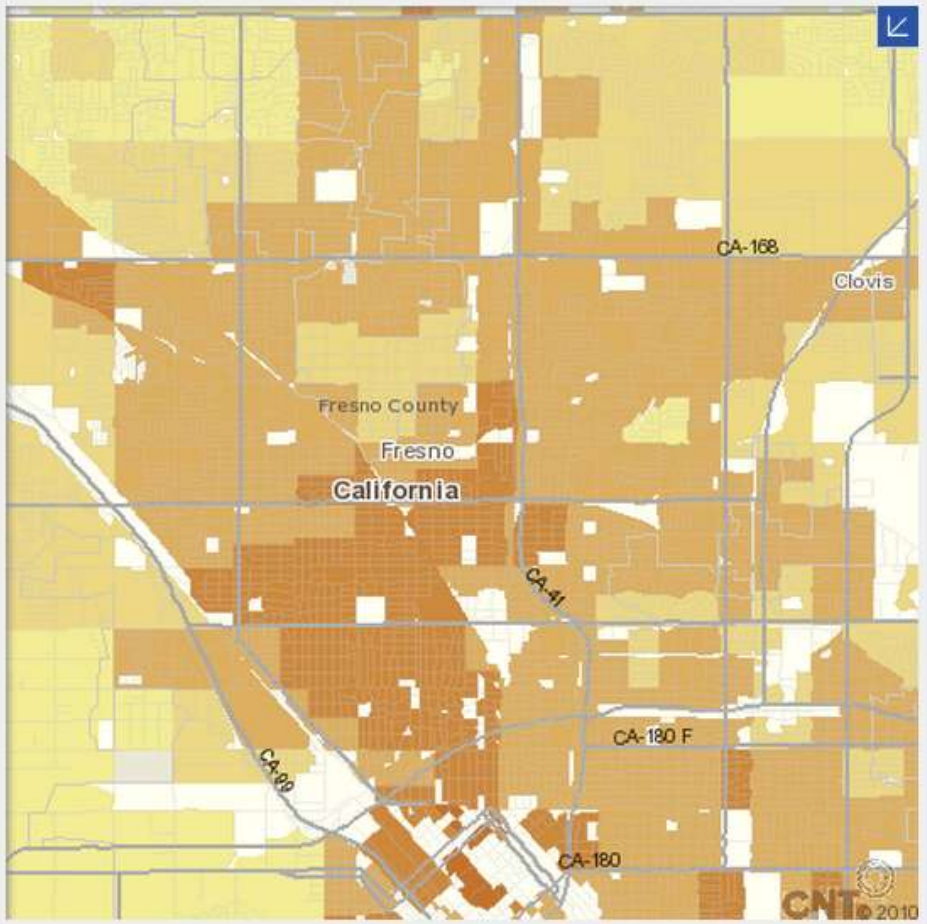



## Transit Access Index (TAI)

Change

- Data Not Available
- Less than 1 Opportunities
- 1 to 3 Opportunities
- 3 to 9 Opportunities
- 9 to 27 Opportunities
- 27 Opportunities and Greater

The Transit Access Index (TAI) was developed by CNT as a measure of transit availability. The TAI is based on the number of bus routes and train stations within walking distance for households in a given Block Group. The TAI does not include the Frequency of Service. This measure is not available to all metro areas because of data acquisition issues.



H+T Index | Gas Cost Impacts | Greenhouse Gas Impacts | Custom Comparison

*Some variables available through H+T Index website.*

## Compare

| Left Map | Right Map | Regional Typical Household | Regional Moderate Household | National Typical Household |
|---|---|---|---|---|

**Household Model Outputs**

- Autos per Household
- Annual Auto Ownership Cost ($)
- Vehicle Miles Traveled (VMT) per Household
- Annual VMT Cost ($)
- Transit Ridership, % of Workers
- Annual Transit Cost ($)
- Household Monthly Transportation Cost

**Model Inputs - Environment Variables**

- Residential Density
- Gross Household Density
- Employment Access Index
- Transit Access Index (TAI)
- Transit Connectivity Index (TCI)
- Average Block Size
- Travel Time to Work
- Travel Time to Work - Transit Commuters
- Travel Time to Work – Non-Transit Commuters

**Model Inputs - Household Variables**

- Median Household Income
- Average Household Income
- Commuters per Household
- Average Household Size

# Walk Score®

http://www.walkscore.com/rankings/

Cities & Neighborhoods | Why It Matters | How It Works | Add Walk Score to Your Site | Blog

Type an Address: Go

| | Neighborhood | Score |
|---|---|---|
| 1 | Midtown | 85 |
| 2 | Montrose | 84 |
| 3 | Downtown | 82 |
| 4 | River Oaks | 77 |
| 5 | Rice | 73 |
| 6 | Galleria-Uptown | 70 |
| 7 | Rice Military | 70 |
| 8 | Westchase | 65 |
| 9 | Greater Heights | 64 |
| 10 | West Houston | 59 |
| 11 | Medical | 58 |
| 12 | Bellaire | 56 |
| 13 | East End | 55 |
| 14 | Spring Branch | 54 |
| 15 | North | 51 |
| 16 | Meyerland | 50 |
| 17 | Sugarland | 49 |
| 18 | Southeast | 47 |
| 19 | Northwest | 47 |
| 20 | Pasadina | 42 |
| 21 | Northeast | 40 |
| 22 | Southwest | 35 |
| 23 | Far Northeast | 30 |

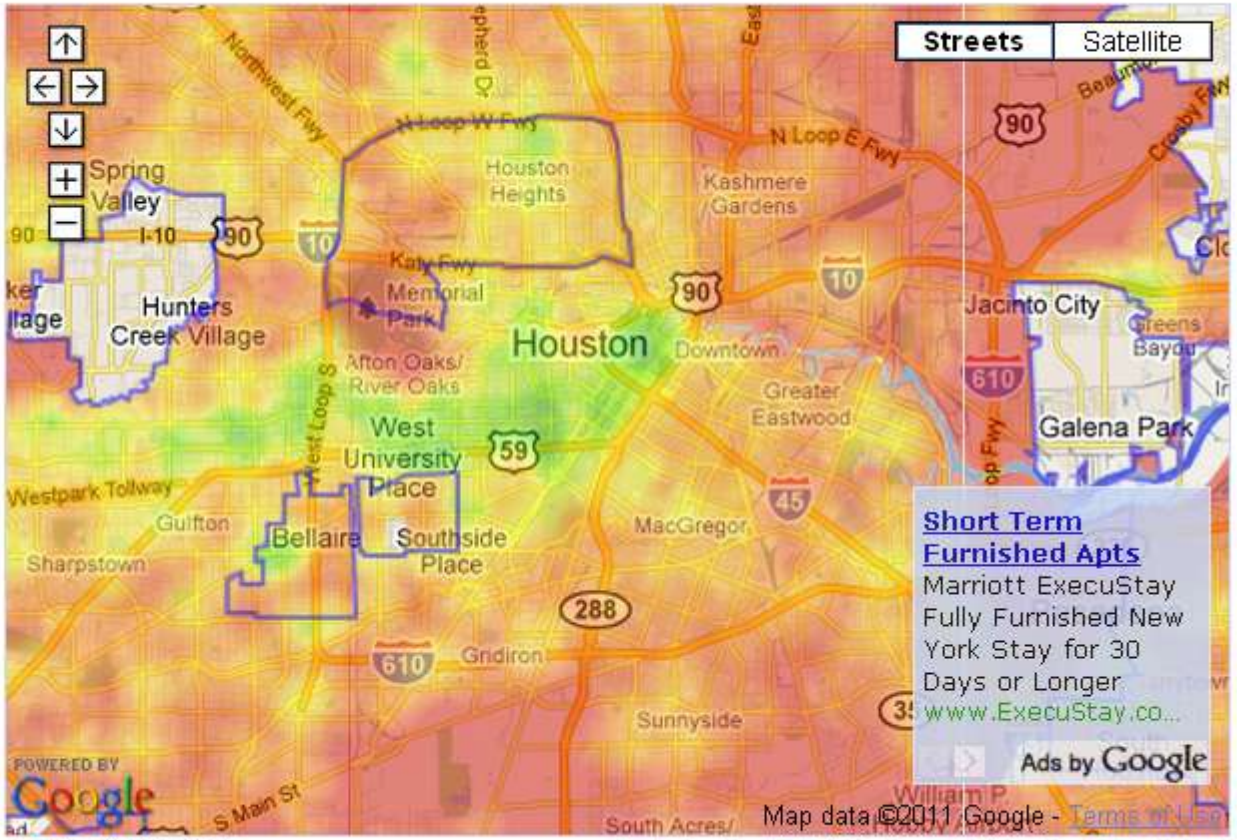
## #9 Greater Heights

Walk Score: 64

Population: 54,438

Walk Score Distribution

0 100



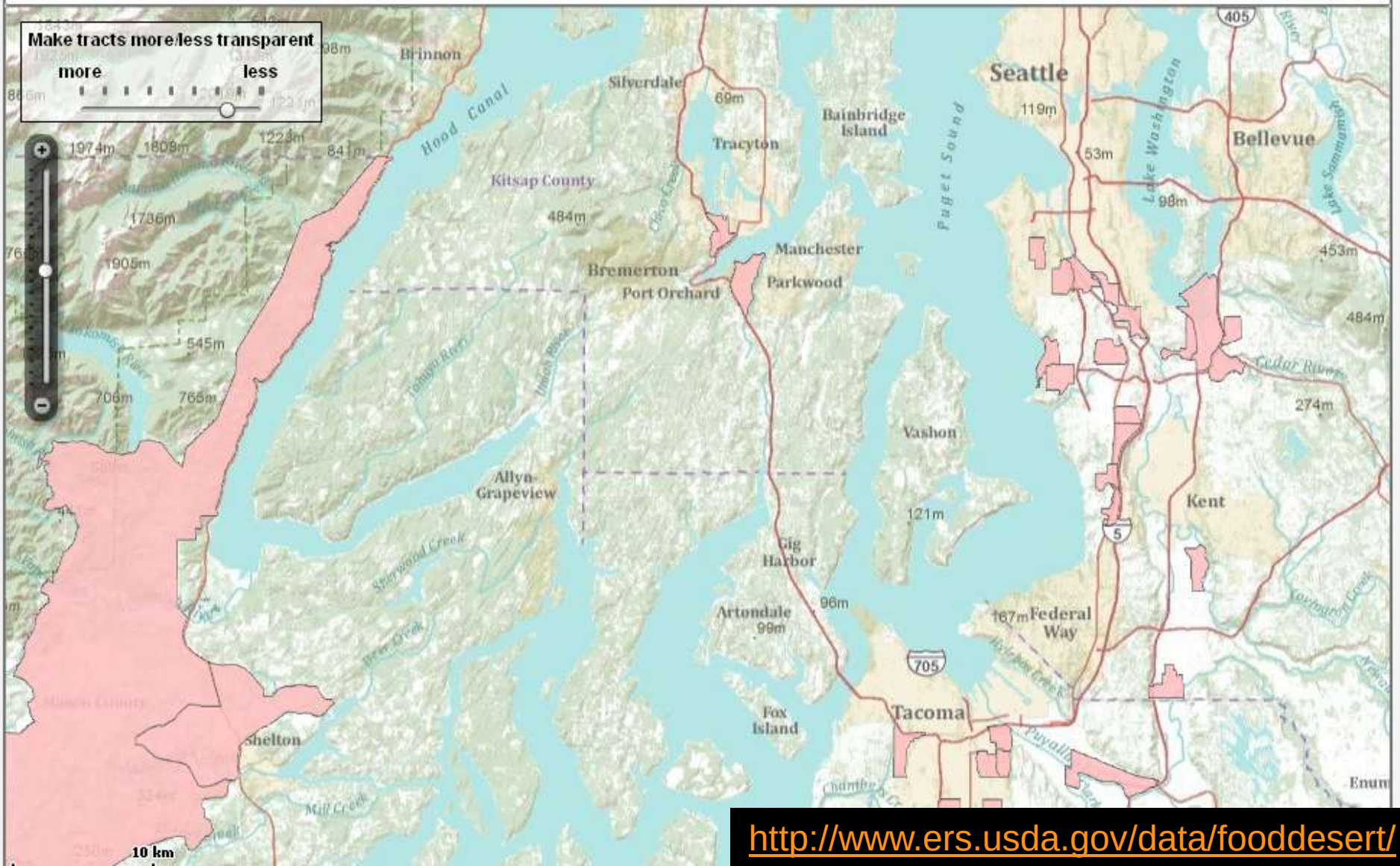

Big Map View

0-49 50-69 70-89 90-100

# Food Desert *Locator*

Highlighted census tracts are food deserts. Click on a tract for details.

Find Address | Change Background | Print Map | ? Help




http://www.ers.usda.gov/data/fooddesert/

# ChangeMatters - Infrared

http://www.esri.com/landsat-imagery/

Search: find address or place | Select Image Map: Infrared | Select Dates: 2000 - 2005 | About